查询PEMD17供应商

# PEMD17; PUMD17

## NPN/PNP resistor-equipped transistors; R1 = 47 kΩ, R2 = 22 kΩ

Rev. 03 — 24 January 2005 Product data sheet

## 1. Product profile

### 1.1 General description

NPN/PNP resistor-equipped transistors.

Table 1: Product overview

| Type number | Package | | PNP/PNP complement | NPN/NPN complement |
|---|---|---|---|---|
| | Philips | JEITA | | |
| PEMD17 | SOT666 | - | PEMB17 | PEMH17 |
| PUMD17 | SOT363 | SC-88 | PUMB17 | PUMH17 |

### 1.2 Features

- Built-in bias resistors
- Simplifies circuit design
- Reduces component count
- Reduces pick and place cost

### 1.3 Applications

- Low current peripheral driver
- Control of IC inputs
- Replacement of general-purpose transistors in digital applications

### 1.4 Quick reference data

Table 2: Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{CEO}$ | collector-emitter voltage | open base | - | - | 50 | V |
| $I_O$ | output current (DC) | | - | - | 100 | mA |
| R1 | bias resistor 1 (input) | | 33 | 47 | 61 | kΩ |
| R2/R1 | bias resistor ratio | | 0.37 | 0.47 | 0.57 | |

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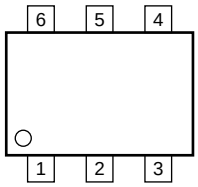
## 2. Pinning information

**Table 3: Pinning**

| Pin | Description | Simplified outline | Symbol |
|---|---|---|---|
| 1 | GND (emitter) TR1 | | |
| 2 | input (base) TR1 | | |
| 3 | output (collector) TR2 | | |
| 4 | GND (emitter) TR2 | | |
| 5 | input (base) TR2 | | |
| 6 | output (collector) TR1 | | |

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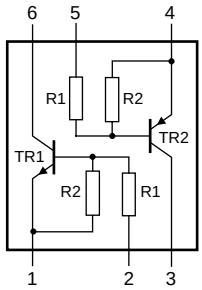


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## 3. Ordering information

**Table 4: Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| PEMD17 | - | plastic surface mounted package; 6 leads | SOT666 |
| PUMD17 | SC-88 | plastic surface mounted package; 6 leads | SOT363 |

## 4. Marking

**Table 5: Marking codes**

| Type number | Marking code [1] |
|---|---|
| PEMD17 | 5N |
| PUMD17 | D9* |

[1] * = -: made in Hong Kong
* = p: made in Hong Kong
* = t: made in Malaysia
* = W: made in China


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## 5. Limiting values

**Table 6: Limiting values**

*In accordance with the Absolute Maximum Rating System (IEC 60134).*

| Symbol | Parameter | Conditions | Min | Max | Unit |
|---|---|---|---|---|---|
| **Per transistor; for the PNP transistor with negative polarity** | | | | | |
| $V_{CBO}$ | collector-base voltage | open emitter | - | 50 | V |
| $V_{CEO}$ | collector-emitter voltage | open base | - | 50 | V |
| $V_{EBO}$ | emitter-base voltage | open collector | - | 10 | V |
| $V_I$ | input voltage TR1 | | | | |
| | positive | | - | +40 | V |
| | negative | | - | –10 | V |
| $V_I$ | input voltage TR2 | | | | |
| | positive | | - | +10 | V |
| | negative | | - | –40 | V |
| $I_O$ | output current (DC) | | - | 100 | mA |
| $I_{CM}$ | peak collector current | | - | 100 | mA |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq 25$ °C | | | |
| | SOT363 | [1] | - | 200 | mW |
| | SOT666 | [1] [2] | - | 200 | mW |
| $T_{stg}$ | storage temperature | | –65 | +150 | °C |
| $T_j$ | junction temperature | | - | 150 | °C |
| $T_{amb}$ | ambient temperature | | –65 | +150 | °C |
| **Per device** | | | | | |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq 25$ °C | | | |
| | SOT363 | [1] | - | 300 | mW |
| | SOT666 | [1] [2] | - | 300 | mW |

[1] Device mounted on a FR4 printed-circuit board, single-sided copper, standard footprint.

[2] Reflow soldering is the only recommended soldering method.



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## 6. Thermal characteristics

**Table 7: Thermal characteristics**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| **Per transistor** | | | | | | | |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | $T_{amb} \leq 25$ °C | | | | | |
| | SOT363 | | [1] | - | - | 625 | K/W |
| | SOT666 | | [1] [2] | - | - | 625 | K/W |
| **Per device** | | | | | | | |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | $T_{amb} \leq 25$ °C | | | | | |
| | SOT363 | | [1] | - | - | 416 | K/W |
| | SOT666 | | [1] [2] | - | - | 416 | K/W |

[1] Device mounted on a FR4 printed-circuit board, single-sided copper, standard footprint.

[2] Reflow soldering is the only recommended soldering method.

## 7. Characteristics

**Table 8: Characteristics**

*$T_{amb}$ = 25 °C unless otherwise specified.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Per transistor; for the PNP transistor with negative polarity** | | | | | | |
| $I_{CBO}$ | collector-base cut-off current | $V_{CB}$ = 50 V; $I_E$ = 0 A | - | - | 100 | nA |
| $I_{CEO}$ | collector-emitter cut-off current | $V_{CE}$ = 30 V; $I_B$ = 0 A | - | - | 1 | µA |
| | | $V_{CE}$ = 30 V; $I_B$ = 0 A; $T_j$ = 150 °C | - | - | 50 | µA |
| $I_{EBO}$ | emitter-base cut-off current | $V_{EB}$ = 5 V; $I_C$ = 0 A | - | - | 110 | µA |
| $h_{FE}$ | DC current gain | $V_{CE}$ = 5 V; $I_C$ = 5 mA | 60 | - | - | |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C$ = 10 mA; $I_B$ = 0.5 mA | - | - | 150 | mV |
| $V_{I(off)}$ | off-state input voltage | $V_{CE}$ = 5 V; $I_C$ = 100 µA | - | 1.7 | 1.2 | V |
| $V_{I(on)}$ | on-state input voltage | $V_{CE}$ = 0.3 V; $I_C$ = 2 mA | 4 | 2.7 | - | V |
| R1 | bias resistor 1 (input) | | 33 | 47 | 61 | kΩ |
| R2/R1 | bias resistor ratio | | 0.37 | 0.47 | 0.57 | |
| $C_c$ | collector capacitance | $V_{CB}$ = −10 V; $I_E$ = $i_e$ = 0 A; f = 1 MHz | | | | |
| | TR1 (NPN) | | - | - | 2.5 | pF |
| | TR2 (PNP) | | - | - | 3 | pF |



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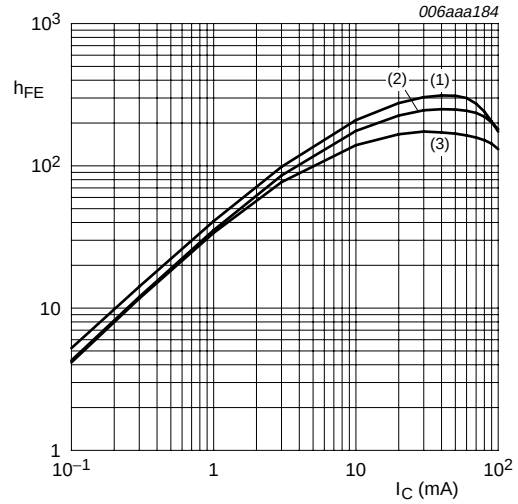


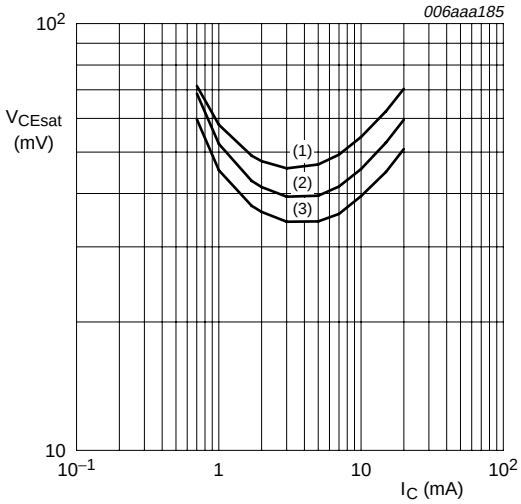

$V_{CE}$ = 5 V

(1) $T_{amb}$ = 100 °C

(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = –40 °C

**Fig 1. TR1 (NPN): DC current gain as a function of collector current; typical values**



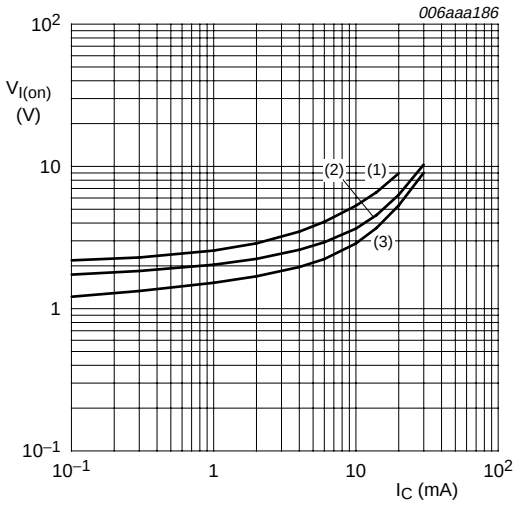

$I_C/I_B$ = 20

(1) $T_{amb}$ = 100 °C

(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = –40 °C

**Fig 2. TR1 (NPN): Collector-emitter saturation voltage as a function of collector current; typical values**



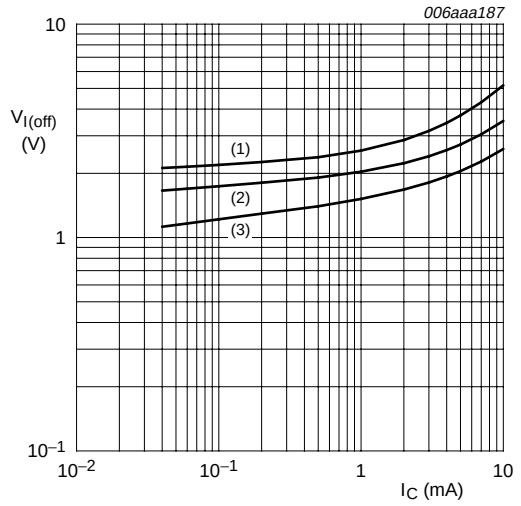

$V_{CE}$ = 0.3 V

(1) $T_{amb}$ = –40 °C

(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = 100 °C

**Fig 3. TR1 (NPN): On-state input voltage as a function of collector current; typical values**




$V_{CE}$ = 5 V

(1) $T_{amb}$ = –40 °C

(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = 100 °C

**Fig 4. TR1 (NPN): Off-state input voltage as a function of collector current; typical values**



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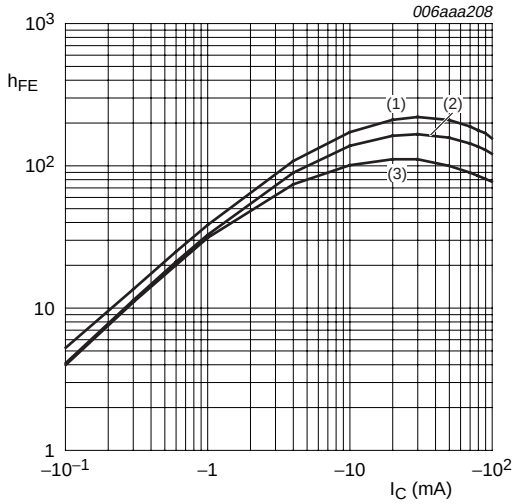


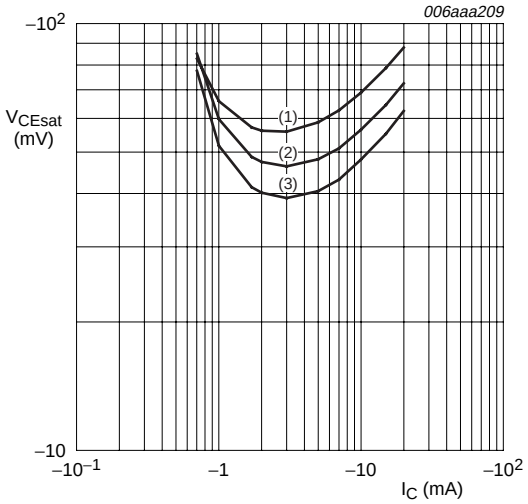

$V_{CE}$ = −5 V

(1) $T_{amb}$ = 100 °C

(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = −40 °C

**Fig 5. TR2 (PNP): DC current gain as a function of collector current; typical values**



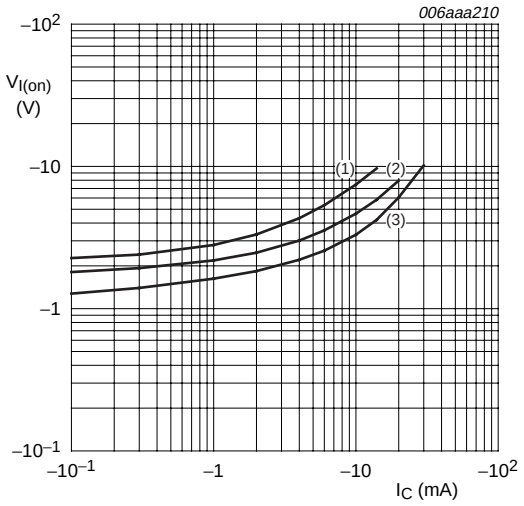

$I_C/I_B$ = 20

(1) $T_{amb}$ = 100 °C

(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = −40 °C

**Fig 6. TR2 (PNP): Collector-emitter saturation voltage as a function of collector current; typical values**



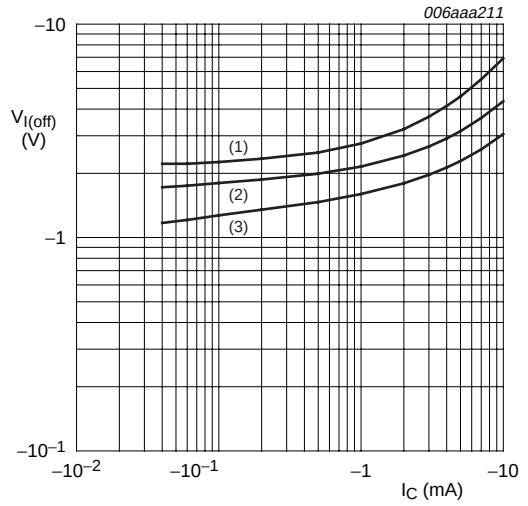

$V_{CE}$ = −0.3 V

(1) $T_{amb}$ = −40 °C

(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = 100 °C

**Fig 7. TR2 (PNP): On-state input voltage as a function of collector current; typical values**




$V_{CE}$ = −5 V

(1) $T_{amb}$ = −40 °C

(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = 100 °C

**Fig 8. TR2 (PNP): Off-state input voltage as a function of collector current; typical values**



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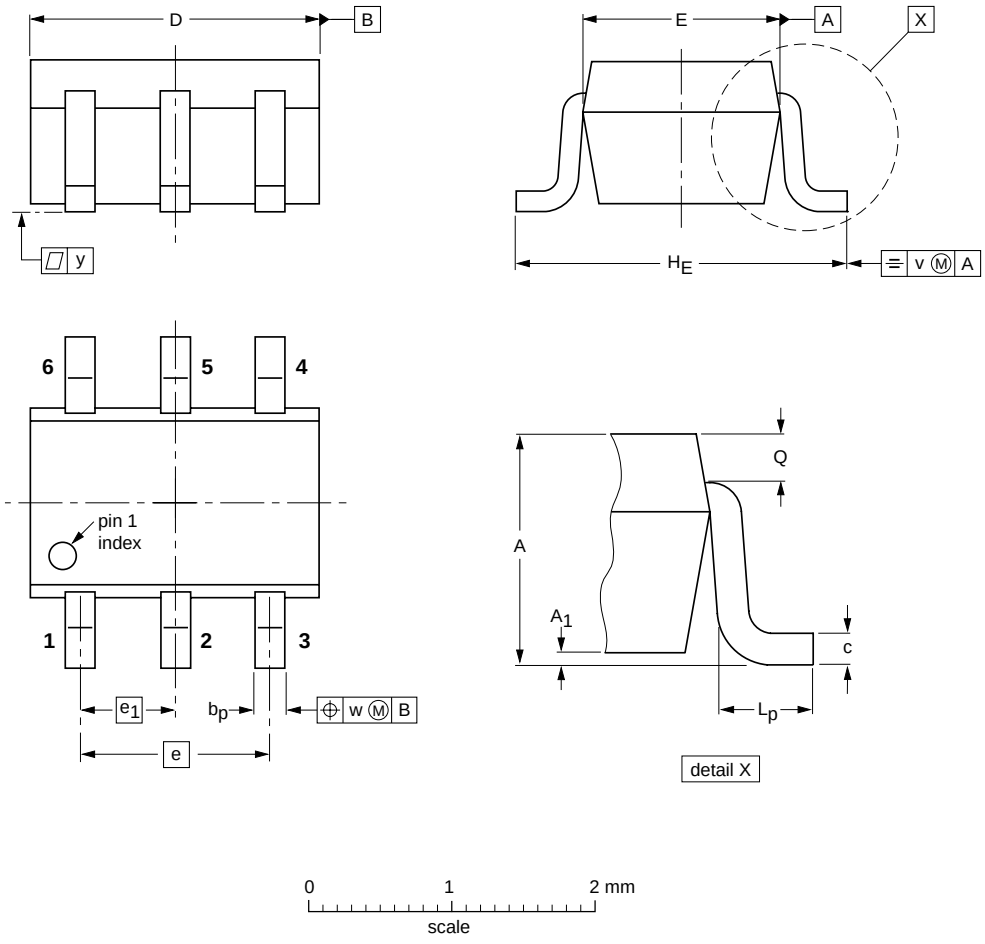
## 8. Package outline

**Plastic surface mounted package; 6 leads** **SOT363**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A | $A_1$ max | $b_p$ | c | D | E | e | $e_1$ | $H_E$ | $L_p$ | Q | v | w | y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.1<br>0.8 | 0.1 | 0.30<br>0.20 | 0.25<br>0.10 | 2.2<br>1.8 | 1.35<br>1.15 | 1.3 | 0.65 | 2.2<br>2.0 | 0.45<br>0.15 | 0.25<br>0.15 | 0.2 | 0.2 | 0.1 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT363 | | | SC-88 | | | ~~97-02-28~~<br>04-11-08 |

**Fig 9. Package outline SOT363 (SC-88)**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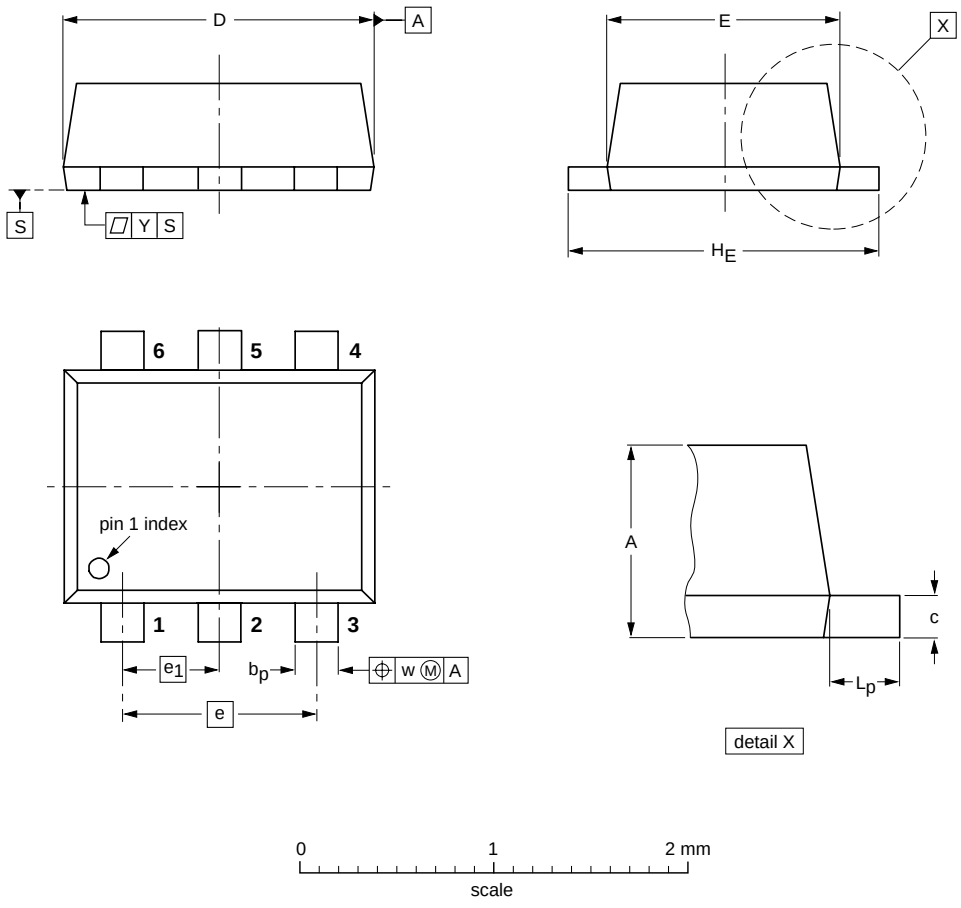
**Plastic surface mounted package; 6 leads** **SOT666**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A | $b_p$ | c | D | E | e | $e_1$ | $H_E$ | $L_p$ | w | y |
|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 0.6<br>0.5 | 0.27<br>0.17 | 0.18<br>0.08 | 1.7<br>1.5 | 1.3<br>1.1 | 1.0 | 0.5 | 1.7<br>1.5 | 0.3<br>0.1 | 0.1 | 0.1 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT666 | | | | | | ~~01-08-27~~<br>04-11-08 |

**Fig 10. Package outline SOT666**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## 9. Packing information

**Table 9: Packing methods**

*The indicated -xxx are the last three digits of the 12NC ordering code.* [1]

| Type number | Package | Description | Packing quantity | | |
|---|---|---|---|---|---|
| | | | 3000 | 4000 | 10000 |
| PEMD17 | SOT666 | 4 mm pitch, 8 mm tape and reel | - | -115 | - |
| PUMD17 | SOT363 | 4 mm pitch, 8 mm tape and reel; T1 [2] | -115 | - | -135 |
| PUMD17 | SOT363 | 4 mm pitch, 8 mm tape and reel; T2 [3] | -125 | - | -165 |

[1] For further information and the availability of packing methods, see Section 14.

[2] T1: normal taping

[3] T2: reverse taping



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## 10. Revision history

**Table 10: Revision history**

| Document ID | Release date | Data sheet status | Change notice | Doc. number | Supersedes |
|---|---|---|---|---|---|
| PEMD17_PUMD17_3 | 20050124 | Product data sheet | - | 9397 750 14367 | PUMD17_2 |
| Modifications: | • This data sheet is an enhancement of data sheet PUMD17_2.<br>• The format of this data sheet has been redesigned to comply with the new presentation and information standard of Philips Semiconductors.<br>• Type PEMD17 added<br>• Table 8 Characteristics: $V_{i(on)}$ input-on voltage and $V_{i(off)}$ input-off voltage renamed to $V_{I(on)}$ on-state input voltage and $V_{I(off)}$ off-state input voltage<br>• Figure 1, 2, 3, 4, 5, 6, 7 and 8 electrical graphs for TR1 (NPN) and TR2 (PNP) added<br>• Table 9 Packing information added | | | | |
| PUMD17_2 | 20040422 | Product specification | - | 9397 750 13099 | PUMD17_1 |
| PUMD17_1 | 20031016 | Product specification | - | 9397 750 11866 | - |


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## 11. Data sheet status

| Level | Data sheet status [1] | Product status [2] [3] | Definition |
|---|---|---|---|
| I | Objective data | Development | This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice. |
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[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

## 12. Definitions

**Short-form specification —** The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

**Limiting values definition —** Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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